



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Telecommunications and**  
**Information Administration**  
Washington, D.C. 20230

OCT 24 2002

Mr. Donald Abelson  
Chief of the International Bureau  
Federal Communications Commission  
445 12th Street SW  
Washington, D.C. 20554

Dear Mr. Abelson:

The National Telecommunications and Information Administration (NTIA), on behalf of the Executive Branch Agencies, has approved the release of additional draft Executive Branch proposals for WRC-03. These proposals consider the federal agency inputs toward the development of U.S. Proposals for WRC-03.

The enclosure contains draft proposals that address agenda items 1.15c and 7.2 (Res 801 - Sup 2.5). These proposals are forwarded for your consideration and review by your WRC-03 Advisory Committee. Jim Vorhies from my staff will contact Alexander Roytblat and reconcile any differences between NTIA and FCC views.

Sincerely,

Fredrick R. Wentland  
Acting Associate Administrator  
Office of Spectrum Management

Enclosure

## United States of America

### DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

**Agenda Item 1.15c:** to review the results of studies concerning the radionavigation-satellite service in accordance with Resolutions **604 (WRC-2000)**, **605 (WRC-2000)** and **606 (WRC-2000)**;

**Background Information:** WRC-2000 introduced a primary allocation in the 5 010-5 030 MHz band to the radionavigation-satellite service (RNSS) (space-to-Earth) (space-to-space), with a provisional aggregate pfd limit of  $-171 \text{ dB(W/m}^2\text{)}$  in the 4 990-5 000 MHz band at any radio astronomy observatory site, not to be exceeded for more than 2% of time, to protect from harmful interference radio astronomy stations operating in this band. In order not to cause harmful interference to the microwave landing system operating above 5 030 MHz, the aggregate pfd limit of space stations operating in the radionavigation-satellite service in the 5 030 - 5 150 MHz band was also limited to  $-124.5 \text{ dB(W/m}^2\text{)}$ , in any 150 kHz band (RR 5.443B).

Resolution **604 (WRC-2000)**, dealing with compatibility between the radio astronomy service (RAS) and the RNSS at 5 GHz, invited the ITU-R to conduct, in time for consideration by WRC-03, the appropriate technical, operational and regulatory studies to review the provisional pfd limit in the 4 990-5 000 MHz band concerning the operation of space stations, including the development of a methodology for calculating the aggregate power levels in order to ensure that the RNSS (space-to-Earth) in the band 5 010-5 030 MHz will not cause interference detrimental to the RAS in the band 4 990-5 000 MHz. Based on the results of the studies, Res. **604 (WRC-2000)** invited WRC-03 to review the provisional pfd limit on the RNSS in the band 4 990-5 000 MHz for out-of-band space-to-Earth emissions of the RNSS operating in the band 5 010-5 030 MHz. The provisions of Resolution **604 (WRC-2000)** currently apply to the band.

Studies conducted within the ITU-R confirmed the adequacy of the provisional aggregate pfd limit to protect radio astronomy stations in the 4 990 - 5 000 MHz band from unwanted emissions of GSO RNSS satellites that might operate in the 5 010 - 5 030 MHz band. For NGSO RNSS systems, a methodology to calculate the detrimental interference threshold adequate to protect radio astronomy sites was developed within the ITU-R, and it is contained in DNR ITU-R M.[Non-GSO/RA].

The proposal includes some consequential changes in Appendix 4, annexes 2A and 2B, as well as the deletion of the parameter C.13 "Class of observations" that is no longer useful.

#### Proposal:

USA/ / 1 MOD

**5.443B** *Additional allocation:* The band 5 010-5 030 MHz is also allocated to the radionavigation-satellite service (space-to-Earth) (space-to-space) on a primary basis. In order not to cause harmful interference to the microwave landing system operating above 5 030 MHz, the aggregate power flux-density produced at the Earth's surface in the band 5 030-5 150 MHz by all the space stations within any radionavigation-satellite service system (space-to-Earth) operating in the band 5 010-5 030 MHz shall not exceed  $-124.5 \text{ dB(W/m}^2\text{)}$  in a 150 kHz band. In order to protect ~~not to~~ not to cause harmful interference to the radio astronomy service in the band 4 990-5 000 MHz, the aggregate power flux density produced in the 4 990-5 000 MHz band by all space stations within any GSO

radionavigation-satellite service (space-to-Earth) system operating in the 5 010-5 030 MHz band shall not exceed ~~the provisional value of -171 dB(W/m<sup>2</sup>)~~ in a 10 MHz band at any radio astronomy observatory site for more than 2% of the time, and the aggregate equivalent power flux density (*epfd*) produced in the 4 990-5 000 MHz band by all space stations within any non-GSO RNSS (space-to-Earth) system operating in the 5 010-5 030 MHz band shall not exceed -245 dB(W/m<sup>2</sup>) in a 10 MHz band, at any radio astronomy observatory site for more than 2% of the time. ~~For the use of this band, Resolution 604 (WRC-2003-2000) applies (WRC-2000).~~

**Reasons:** On the basis of its studies under Resolution 604 (WRC-2000), the ITU-R has confirmed the provisional pfd value in 5.443B for the protection of the RAS in the 4 990 - 5 000 MHz band, from GSO RNSS systems operating in the 5 010 - 5 030 MHz range. For non-GSO RNSS systems operating in the same range, the ITU-R developed the *epfd* concept, a methodology to apply it to compute the *epfd* level at the sites of radio astronomy stations (Recommendation ITU-R M.[non-GSO/RAS], and an *epfd* protection level for the RAS in the 4 990- 5 000 MHz band. Footnote 5.443B, as modified, allows for compatible operation of the RNSS in the 5 010-5 030 MHz band and the RAS in the 4 990-5 000 MHz band.

*NOTE: A separate proposal will be needed to include the value of  $\theta_{min}$ , the lowest angle above the horizon at which a particular radio telescope can observe, among the parameters listed for radio astronomy stations in Appendix 4 of the RR.*

USA/ 12 MOD

#### RESOLUTION 604 (WRC-200003)

**~~Studies on e~~ Compatibility between the radionavigation-satellite service (space-to-Earth) operating in the frequency band 5 010-5 030 MHz and the radio astronomy service operating in the band 4 990-5 000 MHz**

The World Radiocommunication Conference (Istanbul, 2000 Geneva, 2003),

*considering*

~~a) that new radiocommunication services are developing, many of which require satellite transmitters, and need to be allocated sufficient spectrum;~~

*b a)* that research in radio astronomy depends critically upon the ability to make observations at the extreme limits of sensitivity and/or precision;

*e b)* that transmissions from space stations of the radionavigation-satellite service (RNSS) in the frequency band 5 010-5 030 MHz near the radio astronomy service operating in the band 4 990- 5 000 MHz may cause interference harmful to the radio astronomy service (RAS);

*d c)* that Recommendation ITU-R RA.769-1 recommends, *inter alia*, that all practicable steps be taken to reduce to the absolute minimum all unwanted emissions falling into RAS bands, particularly emissions from aircraft, spacecraft and balloons;

*e d)* that protection requirements for RAS are explained and interference threshold values detailed in the Annex to Recommendation ITU-R RA.769-1;

*f e)* that different coupling mechanisms apply to interfering emissions from terrestrial transmitters or from transmitters on board GSO or non-GSO satellites;

~~g)~~ that this conference has revised Recommendation 66, which calls for study of those frequency bands and instances where, for technical or operational reasons, out-of-band emission limits may be required in order to protect safety services and passive services such as radio astronomy, and the impact on all concerned services of implementing or not implementing such limits;

~~h f)~~ that administrations may require criteria to protect RAS from interference detrimental to radio astronomy observations caused by space-to-Earth transmissions of space stations,

*noting*

~~a)~~ that this conference has adopted No. 5.443B specifying a pfd limit in the 4 990 - 5 000 MHz band for out-of-band space-to-Earth emissions of GSO RNSS systems, and an provisional *epfd* limit in the same band 4 990-5 000 MHz for out-of-band space-to-Earth emissions of RNSS systems operating in the band 5 010-5 030 MHz;

~~b)~~ that the general problem of protection of radio astronomy and passive services is under study in ITU-R, *inter alia* in response to Recommendation 66,

*resolves*

~~1.~~ to invite WRC 03 to review the provisional pfd limit on the RNSS in the band 4 990-5 000 MHz for out-of-band space-to-Earth emissions of the RNSS operating in the band 5 010-5 030 MHz;

~~21~~ that the limits indicated in No. 5.443B shall be applied provisionally for RNSS systems operating in the 5 010 - 5 030 MHz band for which complete notification information has been received by the Bureau after 2 June 2000;

~~2~~ that, for non-GSO RNSS systems, the methodology and parameters specified in Recommendation ITU-R M.[non-GSO/RAS] shall be used for the calculation of the aggregate *epfd* levels at the sites of radio astronomy stations

~~3~~ that, as of 3 June 2000, when notifying frequency assignments to a satellite network in the radionavigation-satellite service in the bands 5 010-5 030 MHz, the responsible administration shall provide the calculated values of the aggregate power flux-density in the bands above 5 030 MHz and in the band 4 990-5 000 MHz, as defined in No. 5.443B, in addition to the relevant characteristics listed in Appendix 4.

*urges administrations*

~~1~~ to participate actively in the aforementioned studies by submitting contributions to ITU-R;

~~2~~ to ensure that, to the extent feasible, systems designed to operate in the RNSS frequency band 5 010-5 030 MHz incorporate interference avoidance techniques, such as filtering,

*instructs the Radiocommunication Bureau*

as of the end of WRC-03, to review and, if appropriate, revise any finding previously made in respect of the compliance with the out-of-band emission limits contained in No. **5.443B** of an RNSS (space-to-Earth) system for which notification information has been received before the end of WRC-03; ~~in accordance with resolves 1 and 2 above, this review shall be based on the values, as revised, if appropriate, by WRC-03.~~

**Reasons:** The modified footnote **5.443B** allows for compatible operation of the RNSS in the 5 010-5 030 MHz band and the RAS in the 4 990-5 000 MHz band. The modified Resolution **604 (WRC-2003)** provides guidance to Administrations for the appropriate methodology to be used in computing the epfd levels of non-GSO RNSS systems, and instructs the Bureau to check that RNSS systems advance published between the end of WRC-2000 and WRC-03 are in conformance with the pfd and epfd levels in **5.443B**.

## **APPENDIX 4 (WRC-2000)**

Consolidated list and tables of characteristics for use in the application of the procedures of Chapter III

### **ANNEX 2A**

#### **Characteristics of satellite networks' earth stations or radio astronomy stations<sup>2</sup> (WRC-2000)**

##### **A General characteristics to be provided for the satellite network, earth station or radio astronomy station (WRC-2000)**

##### **A.17 Compliance with aggregate power flux-density limits**

USA/ /3                      **NOC**

##### **A.17 Compliance with aggregate power flux-density limits**

a) For non-geostationary-satellite systems operating in the radionavigation-satellite service in the band 5 010-5 030 MHz, the aggregate power flux-density produced at the Earth's surface in the band 5 030-5 150 MHz in a 150 kHz bandwidth and in the band 4 990-5 000 MHz in a 10 MHz bandwidth, as defined in No. **5.443B**.

**Reasons:** WRC-03 confirmed the provisional pfd limit in the 4 990- 5 000 MHz band and established an epfd limit for GSO RNSS systems and non-GSO RNSS satellite systems, respectively, operating in the 5 010-5 030 MHz band. These limits continue to be found in No. **5.443B**.

##### **B Characteristics to be provided for each satellite antenna beam or each earth station or radio astronomy station antenna (WRC-2000)**

---

<sup>2</sup> See footnote 1.

**B.6 Radio astronomy station antenna characteristics**

The antenna type and dimensions, effective area and angular coverage (in azimuth and elevation), including the minimum angle of elevation above the horizon at which observations are conducted ( $\theta_{min}$ ). For the purposes of epfd calculations,  $\theta_{min} = 5^\circ$  shall be used in the absence of an entry in the Annex 2B Table.

**Reasons:** Calculation of epfd threshold levels, referred to in No. 5.443B and elsewhere in the radio regulations require knowledge of this parameter.

**C Characteristics to be provided for each group of frequency assignments for a satellite antenna beam or an earth station or radio astronomy station antenna****~~C.13 Class of observations~~**

~~The class of observations to be taken on the frequency band shown in § C.3 b). Class A observations are those in which the sensitivity of the equipment is not a primary factor. Class B observations are those of such a nature that they can be made only with advanced low noise receivers using the best techniques.~~

**C.14** Not used. (SUP - WRC-2000)

**C.15** Description of the group(s) required in the case of non-simultaneous emissions (WRC-2000)

**Reasons:** This classification is no longer useful.

# ANNEX 2B

## Table of characteristics to be submitted for space and radio astronomy services

C – Characteristics to be provided for each group of frequency assignments for a satellite antenna beam or an earth station antenna *(end)* (WRC-2000)

USA/ 6 MOD

Items in Appendix	Advance publication of a geostationary-satellite network	Advance publication of a non-geostationary-satellite network subject to coordination under Section II of Article 9	Advance publication of a non-geostationary-satellite network not subject to coordination under Section II of Article 9	Notification or coordination of a geostationary-satellite network (including Appendix 30B)	Notification or coordination of a non-geostationary-satellite network	Notification or coordination of an earth station	Notice for space stations in the broadcasting-satellite service under Appendix 30	Notice for feeder-link stations under Appendix 30A	Notice for stations in the fixed-satellite service under Appendix 30B	Items in Appendix	Radio astronomy
C.9.b.5							X	X		C.9.b.5	
C.9.b.6							X	X		C.9.b.6	
C.9.b.7							X	X		C.9.b.7	
C.9.b.8							X	X		C.9.b.8	
C.9.b.9							X	X		C.9.b.9	
C.9.b.10							X	X		C.9.b.10	
C.9.c			X							C.9.c	
C.9.d			X				X	X		C.9.d	
C.10.a			X	X						C.10.a	
C.10.b			X	X	X			X		C.10.b	
C.10.c.1			X	X	X			X	X	C.10.c.1	
C.10.c.2			X	X	X			X	X	C.10.c.2	
C.10.c.3			O	X	X			X	X	C.10.c.3	
C.10.c.4			X	X	X			X	X	C.10.c.4	
C.10.c.5			X	X	X			X	X	C.10.c.5	
C.10.c.6								X		C.10.c.6	
C.11.a	X <sup>10</sup>	X <sup>10</sup>	X	X	X					C.11.a	
C.11.b								X		C.11.b	
C.11.c							X		X	C.11.c	
C.11.d					X					C.11.d	
C.12									X	C.12	
C.13										C.13	X
C.15							X	X		C.15	

Reasons: Consequential change due to the deletion of C.13.

United States of America

**DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE**

**Agenda Item 7.2:** to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, taking into account Resolution 801 (WRC-2000);

**Background Information:** WRC-03 is competent to make all the decisions that are necessary for allocations within the 4 -10 MHz spectral region through its agenda items 1.23 and 1.36 and, as noted above. All the data and analysis have been done, and will be thoroughly documented in the final CPM report. A proposal to eliminate the preliminary agenda item 2.5 from the final WRC-06 agenda will help to support the general feeling that something should be done to minimize unnecessary workloads at WRCs. Furthermore, WRC-92 reallocated 200 kHz in the 4-10 MHz range to the broadcast service from the fixed service. This reallocation will take affect after 1 April 2007. Any further consideration of reallocation in the 2006 time frame for the broadcast service will necessarily take into account the need for reaccomodation to the fixed service users as a result of WRC-92, and will most likely be viewed unfavorably.

**Proposal:**

USA/ /1      MOD

**RESOLUTION 801 (WRC-2003)**

**Agenda for the 2005/2006 World Radiocommunication Conference**

The World Radiocommunication Conference (~~Istanbul, 2000~~), (Geneva, 2003).

**Reasons:** Editorial

*resolves to give the view*

USA/ /2      SUP

**2.5** to review the allocations to services in the HF bands, taking account of the impact of new modulation and adaptive control techniques and any recommendations by WRC-03 on the adequacy of the frequency allocations for HF broadcasting and the fixed and mobile services (excluding those bands whose allotment plans are in Appendices 25, 26 and 27), from about 4 MHz to 10 MHz;

**Reasons:** WRC-03 is competent to make all the decisions that are necessary for allocations within the 4 -10 MHz spectral region through its agenda items 1.23 and 1.36 and, as noted above. All the data and analysis have been done, and will be thoroughly documented in the final CPM report.